



Evidence of Credit Rationing in Indonesia: Income Class and Collateral

Teguh Santoso^{1✉}, ²Donny Hardiawan, ³Muhammad Faishal Akbar Dwiputra, ⁴Militcyano Samuel Sapulette, ⁵Maman Setiawan

^{1,2,3,4,5}Center for Economics and Development Studies, Universitas Padjadjaran

Article Information Abstract

History of Article

Received July 2022

Accepted September 2022

Published November 2022

Keywords:

Credit Rationing; Credit

Access; Households;

Logit Model

The purpose of this study is to examine the factors that influence household credit availability in Indonesia. In addition, the likelihood of families obtaining credit will be evaluated. Our study is based on the notion of credit rationing, which is represented by two variables: income classes and collateral. Furthermore, various socioeconomic factors are used as household features to get loans. Banks, non-bank financial institutions, and individuals with interest rates are the three types of credit providers. The probit regression approach is used to analyze micro-level data from SUSENAS years 2017, 2018, and 2019. The model's results show that household access to credit from all credit sources is impacted by income classes, collateral, and other socioeconomic characteristics considered. Furthermore, marginal effect estimation results show that higher-income families are more likely to access loans from banks and non-banks, formal financial firms. Poorer households, on the other hand, are more prone to obtain credit through informal sources. Furthermore, property ownership restricts lower-income individuals' access to bank financing (a proxy of the availability of collateral). These findings hold true throughout all observation periods. Based on this information, we contend that credit rationing occurs in Indonesia. The outcomes of this study indicate that policymakers must build a more inclusive financial system right away.

INTRODUCTION

Financial inclusion is defined as the Proportion of individuals and firms that use financial services. Financial inclusion programs attempt to open access to financial services for the poor, who typically have limited access to financial services (Gitaharie, Soelistianingsih, and Djutaharta 2017). Inability to get financial services inhibits consumption smoothing and investments in health, education, and income-generating activities, restricting the poor's growth potential. Previous studies have shown that financial inclusion can be a key driver of economic growth and poverty alleviation, as access to credit can boost job creation, reduce vulnerability to shocks, and increase investments in human capital (Fadun, 2015). Moreover, financial inclusion also positively affects inclusive growth and plays a vital role in achieving Sustainable Development Goals (SDGs) (Sanjaya & Nursechafia, 2015).

Even though financial inclusion is a key part of achieving the SDGs, it is relatively low, especially in developing countries. Globally, Demirguc-Kunt et al., (2015) showed that 2 billion adults remain unbanked. South Asia, East Asia, and the Pacific together account for more than half of the world's unbanked adults. South Asia, home to about 625 million adults without

an account, has about 31 percent of the global total; East Asia and the Pacific, with 490 million unbanked adults, account for about 24 percent. This is no surprise since these two regions are home to the developing world's three most populous countries: China, India, and Indonesia. Indeed, these three countries account for 38 percent of the world's unbanked. India is home to 21 percent of the world's unbanked adults and about two-thirds of South Asia's. China accounts for 12 percent of the world's unbanked, and Indonesia for 6 percent; together, they account for three-quarters of the unbanked in East Asia and the Pacific (Demirgüç-Kunt et al., 2015).

Access to credit is one aspect of financial inclusion. However, several studies show that there are many barriers for households to access credit. There is an affordability barrier (high service charge and interest rate), complicated eligibility (inflexible collateral and complicated document requirements), accessibility barrier (physical access), gender dimension, asymmetric information, lack of financial capability and literacy, and availability barrier or lack of financial product features (financial product provided not to all segments) (Demirgüç-Kunt et al., 2015; Ghosh, 2013; Ledgerwood, Earne, and Nelson 2013). Consequently, financial inclusion is hard to achieve when there are many barriers to accessing credit.

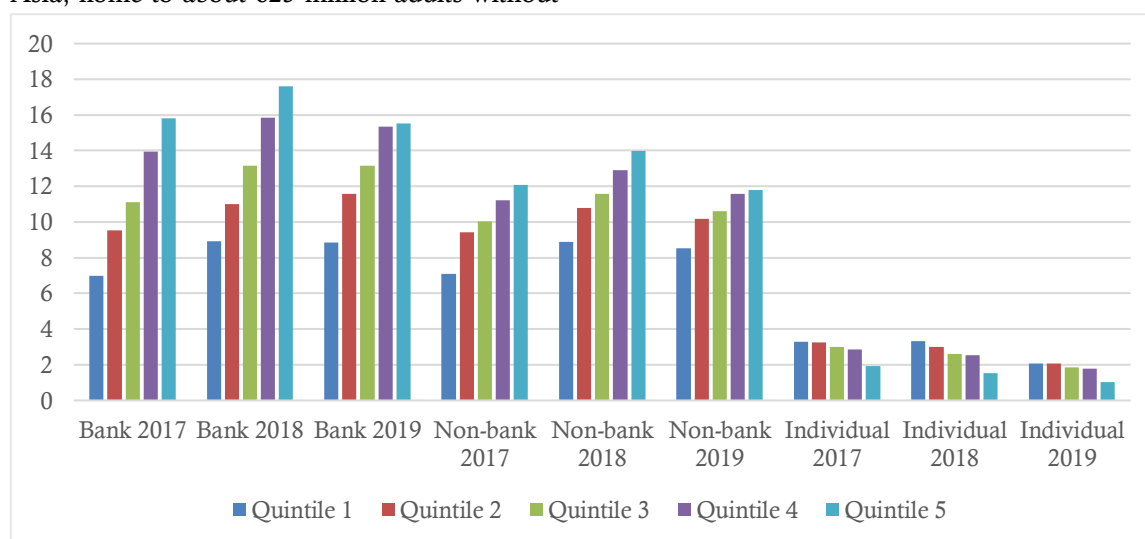


Figure 1. Household Access to Credit by Income Class (Expenditure)

Source: Badan Pusat Statistik (BPS), SUSENAS 2017-2019

One challenging issue of the credit barrier is the availability of credit for all segments of customers. The banking industry is dominated by a few large firms, which concentrate almost exclusively on serving specific commercial and industrial groups. Prospective borrowers who do not belong to these groups face considerable difficulty accessing financial services (Amendola *et al.* 2016; Ledgerwood *et al.*, 2013). From the lender's perspective, financing poor households and microentrepreneurs is risky. Besides the factors of high-interest rates and adverse selection, moral hazard is the main factor contributing to the default rate (Karlan & Zinman, 2009). Therefore, credit rationing is implemented by banks to minimize the default risk and cause a lower rate of lending activity to the poor and microentrepreneurs.

The issue of credit rationing is confirmed by data from the Indonesia National Socio-Economic Survey (Survei Sosial Ekonomi Nasional, SUSENAS) published by Badan Pusat Statistik (BPS). Using SUSENAS for 2017, 2018, and 2019, Figure 1 depicts household access to finance (banks, formal non-bank financial institutions, and individuals) based on the quintile of expenditures. Based on that picture, it is seen that households in the high-expenditure group have more access to credit from banks and non-bank formal financial institutions compared to households in the lower classes. Contrarily, the poorer households tend to get financing access from individual lenders, and it is imposed interest rate. Implicitly, the data reveals that the probability of a poor household accessing credit is lower than that of a rich one.

The limitations that poor households face in accessing credit impact their productivity and welfare. In contrast, greater access to credit increases household productivity and welfare through smoothing consumption and economic self-sufficiency. Households are also more likely to invest in education (Amendola *et al.*, 2016; Karlan & Zinman, 2010). In other words, in Figure 1, with a large percentage of rich households accessing credit, those households will become even more prosperous than the poorer ones. Moreover, poor households usually

cannot provide the collateral required by lenders, either banks or non-bank financial institutions. Therefore, informal or individual lenders are preferred by these poor households, even though these informal lenders charge a significantly higher interest rate. The high-interest rate is a burden and erodes the welfare of households. On the contrary, richer households are usually able to provide collateral for their credit requirements and enjoy a lower interest rate. This contradicts the Sustainable Development Goal of "leaving no one behind."

As far as we know, the study of credit rationing in Indonesia using large-scale data is still limited. Furthermore, former studies only focused on a particular object or a case study from a specific financial institution. For instance, Nuryartono (2007) studied the credit rationing phenomenon in farm households in rural areas by using a specific case in Central Sulawesi. Recently, Wulandari and Kassim (2019) studied the credit rationing of Baitul Maal wa Tamwil (BMT), a kind of non-bank Islamic financial institution, using samples from three provinces in Indonesia.

Therefore, it is essential to understand the possibility of accessing credit or the demand for credit among different households' levels of income in Indonesia. Using the 2017-2019 SUSENAS data, this study explores the households' access to credit from formal and informal financial sources concerning their characteristics, particularly income class and the availability of collateral. Specifically, this research investigates credit rationing by income class as well as the availability of collateral. Moreover, some specific socio-economic factors, such as demography, working status, and the working sector, will be considered to measure the possibility of household access to credit.

By utilizing larger scale data and a broader scope of study objects, it is hoped that this study will not only focus on one credit source but will also cover at least ten financial sources that will be classified into three categories, namely bank, non-bank, and individual, as suggested by Gitaharie *et al.*, (2017). Thus, hopefully, this research will fill the gap associated with the scope

of the previous studies. Moreover, knowing the factors that explain the credit rationing phenomenon will hopefully contribute to the literature that can be utilized as an evidence-based policy-making related to financial inclusion issues in Indonesia.

RESEARCH METHODS

We used the Survey Sosial Ekonomi Nasional/SUSENAS (Badan Pusat Statistik 2017, 2018b, 2019). SUSENAS is a cross-sectional survey for individuals and households conducted annually, and it is representative of Indonesia's population. There are three data sets in SUSENAS: SUSENAS Kor Individual, SUSENAS Kor Household, and SUSENAS Module. SUSENAS Kor Individual and Household (HH) are groups set of general questions related to socioeconomic attributes such as general information of household members, marital, educational, working, and gender status of household head, including information about access to credit and land ownership. The *SUSENAS Module* consists of three modules, i.e., the expenditure module, the socio-culture, the education module, and the health and housing module. *SUSENAS Household Kor* and *SUSENAS Module of Expenditure* are only used in this study. The first one is used to construct socioeconomic factors' attributes and get information about a household's credit access. Moreover, the second one is utilized to calculate per capita expenditure in order to get the income class variable.

In this study, we used SUSENAS *Household Kor* and *Expenditure Module* in 2017, 2018, and 2019. The SUSENAS Kor Household covered 1,132,749; 1,131,825 and 1,204,466 households in the survey years of 2017, 2018 and 2019, respectively. The expenditure module covered 297,276, 295,155, and 315,672 in similar years. The data were utilized to check the consistency of the results within the three periods.

Along with the aim of this study, empirically, we measure the probability of households accessing credit sources either from

formal or informal sources. Consequently, the dependent variable is binary or categorical and can be modeled using a logit or probit model. Those two models similarly can be used to predict the probability of an event. The distinction between those two models is in their assumptions. The logit model uses the cumulative logistic function (F), whereas the probit model uses the cumulative normal function (Φ). Moreover, the logit model uses the cumulative distribution function of the logistic distribution, while the probit model uses the cumulative distribution function of the normal distribution. However, the cumulative distribution function in the probit and logit models is similar, especially around the mean (Wooldridge, 2012)

Keeping in mind that the sample selection in SUSENAS data was done through a randomization process for enumeration. Despite the change in the enumeration timeframe, the multistage sampling (three-stage) from Systematic Random Sampling (SyRS) and Probability Proportional to Size (PPS) sampling methods are still utilized in SUSENAS, which is in line with the assumptions in the probit model that emphasize the random sample in the data. Since it can be more suit to estimate the effect, thus, we used the probit model rather than the logit model to measure the probability of households accessing credit sources. The probit model equation can be written below:

$$\begin{aligned} r(Y = 1 | X) &= \Phi(X'\beta) \\ Pr(Y = 1) &= P(y^* > 0) \\ &= P(\beta_0 + \beta_1 x_1 + \dots \beta_k x_k + u_i > 0) \\ &= P(u_i > -\beta_0 - \beta_1 x_1 - \dots \beta_k x_k) \\ &= P\left(\frac{u_i}{\sigma} > \frac{-\beta_0 - \beta_1 x_1 - \beta_2 x_2 - \dots \beta_k x_k}{\sigma}\right) \dots (1) \end{aligned}$$

Under the probit model, we can observe y as a household accessing credit, which takes the value of 1 if $y^* > 0$ and 0 otherwise. The distribution of $\frac{u_i}{\sigma}$ is standard normal. Since the normal distribution is symmetric, we can estimate the probit model using a maximum likelihood estimator that follows a certain probability density function of a probability distribution. For most cases of practical interest,

the performance of maximum likelihood estimators is optimal for large enough data, such as SUSENAS. Thus, we can rewrite equation (1) as shown below:

$$\begin{aligned} P(y = 1) &= P\left(\frac{u_i}{\sigma} > \frac{-\beta_0 - \beta_1 x_1 - \dots - \beta_k x_k}{\sigma}\right) \\ &= P\left(\frac{u_i}{\sigma} < \frac{\beta_0 + \beta_1 x_1 + \dots + \beta_k x_k}{\sigma}\right) \\ &= \Phi\left(\frac{\beta_0 + \beta_1 x_1 + \dots + \beta_k x_k}{\sigma}\right) \dots \dots \dots (2) \end{aligned}$$

Under the assumption of the probit model, the scale for estimating probability is a log-odds scale. This scale is not enough to accurately describe the scale for estimating probability. So, we use marginal effects to ensure a probability scale when trying to understand non-linear probability models. On a probability scale, all effects are non-linear in that they depend on the value of the covariate at a probability that must be bounded between 0 and 1. The relationship between the independent and dependent variables is also not linear. The expected change in probability depends on the value of the independent variable and other covariates in the marginal effect coefficient, where the coefficient indicates a change in probability when the predictor or independent variable increases by one (Wooldridge 2012).

The coefficients resulting in equation (2) are not marginal effects and cannot be directly interpreted. To get the marginal effect from the probit estimator, we need to differentiate equation (2) as shown below:

$$\begin{aligned} \frac{dE(y_i|x)}{dx} &= E(y_i|x) = P(y_i = 1|x) \\ &= \Phi\left(\frac{\beta_0 + \beta_1 x_1 + \dots + \beta_k x_k}{\sigma}\right) \beta_i \dots \dots \dots (3) \end{aligned}$$

The general form of the probit model used in this study is depicted as follows:

$$\begin{aligned} Pr(\text{credit source} = 1 | X) &= \phi(\beta_0 + \beta_k x_k + \varepsilon_i), \\ k &= 1, 2, \dots, N \dots \dots \dots (4) \end{aligned}$$

The dependent variable for binary response reflects a dichotomous variable (1 = access to a certain credit source; 0 = no access to credit) is the independent variable that may influence households accessing credit from a certain source. We used this general probit equation to estimate the probability of

households accessing credit from a bank, non-bank financial institution, and individuals attributed by income class and collateral as a parameter of credit rationing and several socioeconomic variables. The marginal effect depicted in equation (3) explains how the predicted probability of a binary outcome, i.e., access to a certain credit source, changes with a change in a particular attribute.

Empirically, there are three models of probit regression. The distinction between those three models is only on their dependent variables, which are household credit access from banks, non-bank financial institutions, and individuals' interest rates. The models from equations (5) and (6) are models for households with access to credit from a bank and non-bank financial institutions and formal credit sources, respectively. Meanwhile, model (7) is the model for those who get credit from an individual with an interest rate, an informal credit source. Each model can be written as follow:

$$\begin{aligned} \text{banks}_i &= \beta_0 + \beta_1 \text{income_class}_i + \beta_2 \text{land}_i + \\ &\quad \beta_3 \text{marital_status}_i + \\ &\quad \beta_4 \text{working_sector}_i + \beta_5 \text{location}_i + \\ &\quad \beta_6 \text{age}_i + \beta_7 \text{age}^2_i + \beta_8 \text{HH_members}_i + \\ &\quad \beta_9 \text{gender}_i + \beta_{10} \text{education} + \varepsilon_i \dots \dots (5) \end{aligned}$$

$$\begin{aligned} \text{non_banks}_i &= \alpha_0 + \alpha_1 \text{income_class}_i + \\ &\quad \alpha_2 \text{land}_i + \alpha_3 \text{marital_status}_i + \\ &\quad \alpha_4 \text{working_sector}_i + \alpha_5 \text{location}_i + \\ &\quad \alpha_6 \text{age}_i + \alpha_7 \text{age}^2_i + \alpha_8 \text{HH_members}_i + \\ &\quad \alpha_9 \text{gender}_i + \alpha_{10} \text{education} + \varepsilon_i \dots \dots (6) \end{aligned}$$

$$\begin{aligned} \text{individuals}_i &= \delta_0 + \delta_1 \text{income_class}_i + \\ &\quad \delta_2 \text{land}_i + \delta_3 \text{marital_sector}_i + \\ &\quad \delta_4 \text{working_status}_i + \delta_5 \text{location}_i + \\ &\quad \delta_6 \text{age}_i + \delta_7 \text{age}_i + \delta_8 \text{HH_members}_i + \\ &\quad \delta_9 \text{gender}_i + \delta_{10} \text{education} + \varepsilon_i \dots \dots (7) \end{aligned}$$

here are several explanatory variables that are exactly similar among the three models, which are associated with the amount of expenditure and the socioeconomic attributes, namely land ownership, marital status of HH head, the number of families, members (HH_members), gender, working sector, age of HH head, and education and the location of living. income_class is the class of per capita expenditure. In its calculations, individuals are

shorted by expenditure level by value and grouped into percentiles (Maipita & Wahyudi, 2017). To divide the expenditure on SUSENAS data into quintiles, households were ranked based on their income and then weighted by the population frequency weight (Johar et al. 2018). Several studies stated that, for developing countries, the calculation of inequality with expenditure data is more reliable than income

data (Hardiawan, Yusuf, and Muljarijadi, 2018; Yusuf & Sumner, 2015; Yusuf, Sumner, and Rum, 2014). We divided all individuals into five quintiles based on per capita expenditure data from SUSENAS. These quintiles are created for each sampled year. Quintile 1 represents the highest group of per capita expenditure and contrarily for quintile 5. The description of all variables used is depicted in Table 1:

Table 1. Description of Variables

Variables	Definition and Scale	Sources	References
<i>Banks</i>	Credit that received by household member from bank including (i) <i>Kredit Usaha Rakyat (KUR)</i> ; (ii) Credit from commercial banks other than KUR except <i>Kredit Pemilikan Rumah (KPR)</i> and (iii) Credit from <i>Bank Perkreditan Rakyat (BPR)</i> Nominal scale, Dummy variables: 1 if household members received credit from sources (i) and/or; (ii); and/or (iii) 0 if otherwise	SUSENAS KOR Household (2017,2018,2019)	Gitaharie, Soelistianingsih, and Djutaharta (2017)
<i>Non-Banks</i>	Credit that received by household members from non-bank financial institution involving (iv) credit from cooperative; (v) pawnbroker/pawnshop; (vi) leasing companies; (vii) <i>Kelompok Usaha Bersama (KUBE)</i> and (viii) <i>Badan Usaha Milik Desa (BUMDes)</i> Nominal scale, Dummy variables: 1 if one of the household members received credit from sources (iv) and/or (v); and/or (vi); and/or (vii) 0 if otherwise	SUSENAS KOR Household (2017,2018,2019)	Gitaharie, Soelistianingsih, and Djutaharta (2017)
<i>Individuals</i>	Credit that received by household members from (ix) individual-interest rate Nominal scale, Dummy variable: 1 if one of the household members receives credit from individuals with interest (ix) 0 if otherwise	SUSENAS KOR Household (2017,2018,2019)	Gitaharie, Soelistianingsih, and Djutaharta (2017)
<i>Income_class</i>	Classes of per capita expenditure. To calculate the classes, individuals are sorted by expenditure level by value and grouped into quintiles (5 groups). To divide the expenditure on SUSENAS data into quintiles, households were ranked based on their income then weighted by the population frequency weight. Income class is calculated based on the district of residence.	SUSENAS MODUL BLOK43 (2017,2018,2019)	Maipita and Wahyudi (2017); Johar et al. (2017); Hardiawan, Yusuf, and Muljarijadi (2018); Yusuf and Sumner (2015); Yusuf, Sumner, and Rum (2014)
<i>Land Ownership</i>	Residence ownership status Nominal scale, Dummy variable: 1 if the household lives in their own house 0 if otherwise	SUSENAS KOR Household (2017,2018,2019)	Cai et al. (2018)
<i>Marital status</i>	Marital status of household head Nominal scale, Dummy variables:	SUSENAS KOR Individual (2017,2018,2019)	Tran et al. (2018)

Variables	Definition and Scale	Sources	References
	1 if household head is single, 2 if household head is marriage, 3 if household head is divorce, and 4 if household head is widowed		
<i>Working sector</i>	An information about sector which household head works Nominal scale , Dummy variables: 1 if household head working in formal sector, 2 if household head working in informal sector, and 3 if household head is not working Working status and working in formal or informal sector calculated based on ICLS13	SUSENAS KOR Individual (2017,2018,2019)	Zanin (2017)
<i>Location</i>	The geographical residence of the respondent Nominal scale, Dummy variable: 1 if respondents living in rural area; 0 if respondents living in urban area	SUSENAS KOR Household (2017,2018,2019)	Barslund and Tarp (2008)
<i>Gender</i>	Gender status of household head Nominal scale, Dummy Variable: 1 if household head is male and 0 if household head is female	SUSENAS KOR Individual (2017,2018,2019)	Tran et al. (2018).
<i>Age</i>	Age of household age Continuous	SUSENAS KOR Individual (2017,2018,2019)	Barslund and Tarp (2008)
<i>Education</i>	Household's level of education Nominal scale, Dummy variable: 1 No or never attended school, 2 Primary school, 3 Junior high school, 4Senior high school, 5 College	SUSENAS KOR Individual (2017,2018,2019)	Barslund and Tarp (2008)
<i>Household members</i>	The number of household member Continuous	SUSENAS KOR Individual (2017,2018,2019)	Barslund and Tarp (2008)

Source: Data Processed, 2022

In associating with credit rationing, there are two variables that represent it. Firstly, the credit rationing phenomenon can be associated with the possibility of the household accessing credit from either formal or informal sources that are attributed to the income class. It can be argued that the kind of credit source is a matter related to its access as well as its amount.

There were several empirical findings regarding that. Dinh et al. (2013) found that in the formal sources, the lowest income group faces more credit rationing than other groups. Additionally, Togba (2012) also found that low-income households tend to prefer informal sources of credit, and smaller loans are also channeled through the informal sector. Zeller (1994) also suggested that the portion of wealthy households who access credit from formal sources is greater than that of poorer households. Besides that, the poorer households also pay

higher interest rates than the richer ones. In the case of Indonesia, related to poverty status, Gitaharie et al. (2017) found that poor households are less likely to access credit from formal sources, particularly from banks. Moreover, nearly poor and not poor households are two times more likely to access credit from those sources relative to poor households.

Secondly, credit rationing is also attributed to collateral. Baster (1985) argued that the interest rate is inversely related to collateral requirements. Low-risk entrepreneurs can raise a sufficient amount of collateral to distinguish themselves from high-risk ones. Thus, they pay a lower interest rate. Technically, borrowers with high-risk profiles pay a higher interest rate but post no collateral. That condition makes it difficult for lower-income borrowers who do not have assets as credit collateral and are forced to pay a higher interest rate to access credit.

However, the high-interest rate is also a burden for lower-income borrowers. Thus, they will have difficult access to credit, particularly from formal sources.

This research used several household socioeconomic conditions as control variables. The marital_status variable was divided into four classifications: single, married, divorced, and widowed (Zanin, 2017). The working_status variable was divided into three groups: working in the formal sector, working in the informal sector, and not working (Skott and Gómez-Ramírez, 2018). Working status with the help of permanent workers and other laborers is considered formal sector employment; other than that, it is considered informal sector employment (Badan Pusat Statistik, 2018a). For the education variable, the level of education of the heads of households is classified as no school, primary school, junior high school, high school, or college (Gutiérrez & Teshima, 2016). We also use the gender of the heads of the households, the location of residence, and the age of the head of the household.

RESULTS AND DISCUSSION

Three periods of cross-sectional data used in this study consisted of the number of households surveyed in SUSENAS Kor Household. In 2017, there were 297,276 observed households, and 295,155 in 2018. Moreover, in 2019 the number of households surveyed was 315,672.

We provide detailed information (summary statistics) on our dataset in Table 2. Table 2 shows that the percentage of households with credit access from banks increased from 12.47% in 2017 to 14.15% in 2018 and slumped to 13.47% in 2019. Furthermore, the percentage of households with credit access from non-banks increased from 9.35% in 2017 to 10.44% in 2018 and down to 9.11% in 2019. This pattern contrasts with household credit access from individuals. Household access has decreased from 2.56% in 2017 to 1.58% in 2019. Our sample shows that the heads of the households in the lowest income class have the fewest numbers and percentages, while the heads of the

households in the highest income class have the most. This value is consistent in both 2017, 2018, and 2019.

The most common marriage status criteria in our sample are married household heads, followed by widowed, divorced, and single. For the type of employment status, the largest portion of our sample work is in the formal sector (55.09%-54.49%), the informal sector (32.75%-33.76%), and the unemployed (12.6% -11.74%). In the sample period, the number of respondents living in rural areas is always higher than those in urban areas.

The number and percentage of male household heads are higher than women. The percentage of households owning land is higher than those that do not. Furthermore, the average respondent is 48 years old. Finally, based on the level of education, most respondents are those who graduated from primary school (27.95% - 29.63%), and the lowest were those who graduated from college (8.03% - 8.78%).

The logistic regression results depicted in the appendix show the determinants of credit, both formal financial institutions (banks and non-banks) and informal sources (individuals) in the period 2017, 2018, and 2019. We performed probit regression estimations at the household level to analyze the effect of income classes on household access to credit.

Overall, in the observation period, the households' accessibility to formal and informal credit is successfully explained by income class (expcap_grup), land ownership, marital status, working status, geographical factor (location of residents), age, household members, and gender. However, not all variables are consistent with the sign and significance during observation periods. The main variables used to explain the credit rationing phenomenon, such as income class and collateral, are consistent both in sign and significance along a period of observation. The socio-economy factors as explanatory variables, such as geographic factors, age, household members, and gender, showed varying results, both in sign and significance. Only marital status, working status, and education as explanatory variables are consistent, both in sign and significance, during all the observation periods.

Table 2. Summary Statistics

<i>Variable</i>	<i>Classification</i>	<i>2017</i>		<i>2018</i>		<i>2019</i>	
		Freq.	% or Mean	Freq.	% or Mean	Freq.	% or Mean
<i>Banks</i>	No	260,204	87.53	253,391	85.85	273,157	86.53
	Yes	37,072	12.47	41,764	14.15	42,515	13.47
<i>Non-Bank</i>	No	269,488	90.65	264,341	89.56	286,918	90.89
	Yes	27,788	9.35	30,814	10.44	28,754	9.11
<i>Individual</i>	No	289,674	97.44	288,281	97.67	310,677	98.42
	Yes	7,602	2.56	6,874	2.33	4,995	1.58
<i>Income Class</i>	1 20% poorest	50,725	17.06	52,621	17.83	56,581	17.92
	2 20% poorer	54,351	18.28	55,008	18.64	58,123	18.41
	3 20% middle	60,245	20.27	59,073	20.01	63,565	20.14
	4 20% richer	65,070	21.89	64,066	21.71	68,123	21.58
	5 20% richest	66,885	22.5	64,387	21.81	69,280	21.95
<i>Marital Status</i>	1. Single	9,517	3.2	8,880	3.01	10,094	3.2
	2. Married	238,226	80.14	238,039	80.65	252,122	79.87
	3. Divorced	9,648	3.25	9,293	3.15	10,538	3.34
	4. Widowed	39,885	13.42	38,943	13.19	42,918	13.6
<i>Working Sector</i>	1. Working in Formal Sector	97,356	32.75	99,536	33.72	106,577	33.76
	2. Working in Informal	163,758	55.09	159,831	54.15	172,021	54.49
	3. Not Working	36,162	12.16	35,788	12.13	37,074	11.74
<i>Location</i>	Rural	169,586	57.05	168,589	57.12	184,976	58.6
	Urban	127,690	42.95	126,566	42.88	130,696	41.4
<i>Gender</i>	Female	46,093	15.51	45,481	15.41	49,336	15.63
	Male	251,183	84.49	249,674	84.59	266,336	84.37
<i>Land</i>	No	78,131	26.28	76,214	25.82	80,435	25.48
	Yes	219,145	73.72	218,941	74.18	235,237	74.52
<i>Age (years)</i>	-	297,276	48.39	295,155	48.5	315,672	48.76
	0. No or never attended school	70,437	23.69	72,355	24.51	74,688	23.66
<i>Education</i>	1. Primary school	88,082	29.63	82,508	27.95	88,843	28.14
	2. Junior high school	45,470	15.3	44,804	15.18	49,028	15.53
	3. Senior high school	69,419	23.35	69,832	23.66	75,401	23.89
	4. College	23,868	8.03	25,656	8.69	27,712	8.78

Source: Data Processed, 2022

The Table 3 shows the probability of determinant variables to access credit from three sources can be seen from the marginal effect relative to its baseline from each variable. The baseline is the basis condition as a comparison with a certain status or category. For the income class variable, the lowest income – 20% poorest

households is the baseline. It is because, the poorest households are predicted that they are less likely to access credit primarily from formal sources, the ME of other income classes would be positive.

Having collateral is the baseline for the land variable. It is due to the fact that land

ownership of residential status can be used as a collateral to borrow money, particularly from formal financial institution. Single is the baseline for the marital status because the married or ever married HH head have greater responsibility in it increase the possibility to get credit, the ME of other marital status would be positive. Working in formal sector is a baseline for working sector variable, due to the probability of this status to access credit is presumed higher than others, therefore the ME would be negative.

No or never attend school is the baseline for education variable. It is because, for those who have a higher degree of education, it is presumed that they will have a higher probability to get credit, therefore the ME would be positive. Rural is the baseline of location variable due to the fact that the credit sources are largely available in urban rather than rural, therefore the ME would be positive. Female is the baseline for gender variable. Interestingly, however, the ME is presumed that it could be either positive or negative. It is because, for accessing credit from bank, the probability of male would be potentially higher than female. Meanwhile, for other credit sources, it may be lower.

The discussion is divided into two sections. First is the discussion of the credit rationing phenomenon related to income class and household land ownership, and the discussion regarding explanatory factors that consist of the household's socioeconomic characteristics would also be discussed regarding their probability to access credit.

Based on Table 3, the accessibility to banks' credit access reveals that higher household income increases the probability of credit access in all of the observation periods. In 2017, 2018, and 2019, the highest income class (*expcap_grup* 5) has 11.1 – 12.4 percentage points higher than the lowest income class. In similar periods, the fourth income class (*expcap_grup* 4) has 8.4 – 8.8 percentage points higher than the lowest income class. Meanwhile, for credit access from non-banks, those two income classes have 4.5 – 5.4 and 3.2 – 4.0 percentage points higher than the lowest income class in 2017-2019, respectively. On the contrary, for credit access from informal sources (individuals), the highest income class has 0.465– 0,74 percentage points lower than the

lowest income class. The fourth income class also has a 0.05 – 0.35 percentage point lower than the lowest income. These results are consistent in all observation periods.

These findings imply that bank and non-bank financial institutions (formal sources of credit) prefer to open their access to richer households rather than poorer ones. On the contrary, poorer households are more likely to access credit from individuals (informal sources). The credit is rationed based on income class, as seen from the results. These results are consistent with previous studies by Banerjee & Duflo (2007); Gitaharie *et al.* (2017); Khoi *et al.* (2013); Togba (2012); Zeller (1994).

However, there are other interesting findings from households' access to banks. In 2017 and 2018, the probability of household in the income class 2 (*expcap_2*) is 2.76 and 2.75 percentage points higher than the lowest income household, respectively. This number jumps to 3.1 percentage points higher than the lowest income group in 2019. On the other hand, the probability of the highest-income households accessing credit from the banks in 2019 is 11.1 percentage points higher relative to the lowest-income group, which is lower than in 2018 and in 2017 at 12,6 and 12,3 percentage points, respectively. Implicitly, those findings can be a sign that inequality of credit accessibility, particularly from banks, decreases over the three periods. Overall, the household's accessibility to credit from formal sources in 2019 in relation to their income classes is better than in 2017 and 2018.

The credit rationing phenomenon can also be explained by the probability of households that own lands. The lands owned by households can be used as credit collateral. The coefficient of households who own lands is positive and significant to banks' credit access. The probability of those households is 3.9, 4.9, and 5 percentage points higher than the households who do not have lands in 2017, 2018, and 2019, respectively. This finding confirms that households who own lands are more likely to access credit from banks than those who do not own lands. These findings are similar to the findings of Barslund & Tarp (2008); Besanko & Thako (1987).

Table 3. Marginal Effect Result

Variables	2017			2018			2019		
	Banks	Non-Banks	Individual	Banks	Non-Banks	Individual	Banks	Non-Banks	Individual
20% Poorest	.	.	.	.	.	.	.	.	.
20% Poorer	0.0272*** (16.71)	0.0167*** (10.51)	-0.0000144 (-0.01)	0.0270*** (14.88)	0.0176*** (10.10)	-0.000524 (-0.53)	0.0314*** (18.66)	0.0135*** (8.93)	0.00118 (1.61)
20% Middle	0.0499*** (29.52)	0.0251*** (15.58)	-0.00130 (-1.34)	0.0521*** (28.03)	0.0257*** (14.78)	-0.00200** (-2.07)	0.0513*** (29.64)	0.0218*** (14.09)	0.000285 (0.39)
20% Richer	0.0840*** (46.32)	0.0378*** (22.45)	-0.00261*** (-2.64)	0.0885*** (45.54)	0.0404*** (22.49)	-0.00350*** (-3.63)	0.0847*** (45.68)	0.0329*** (20.21)	-0.000520 (-0.70)
20% Richest	0.122*** (55.86)	0.0496*** (25.67)	-0.00656*** (-6.29)	0.124*** (55.58)	0.0545*** (27.16)	-0.00745*** (-7.35)	0.110*** (50.67)	0.0451*** (23.96)	-0.00465*** (-6.04)
Single	.	.	.	.	.	.	.	.	.
Married	0.0837*** (32.18)	0.0457*** (16.72)	0.0121*** (7.89)	0.104*** (39.33)	0.0595*** (21.81)	0.0142*** (10.88)	0.0957*** (37.65)	0.0561*** (23.90)	0.00962*** (9.10)
Divorce	0.0382*** (9.96)	0.0263*** (6.90)	0.00636*** (3.09)	0.0503*** (12.46)	0.0332*** (8.58)	0.0113*** (5.75)	0.0480*** (12.67)	0.0355*** (10.51)	0.00980*** (6.24)
Widowed	0.0476*** (14.87)	0.0239*** (7.59)	0.00556*** (3.23)	0.0628*** (18.76)	0.0276*** (8.83)	0.00765*** (5.11)	0.0648*** (20.20)	0.0290*** (10.64)	0.00476*** (4.11)
Own Land (1=Yes)	0.0384*** (25.73)	0.000450 (0.35)	-0.00534*** (-7.97)	0.0487*** (30.87)	0.000701 (0.53)	-0.00495*** (-7.71)	0.0499*** (32.88)	-0.000279 (-0.23)	-0.00299*** (-5.85)
Working in formal sector	.	.	.	.	.	.	.	.	.
Working in informal sector	-0.00204 (-1.44)	-0.0168*** (-12.86)	0.00342*** (4.91)	-0.00244* (-1.65)	-0.0196*** (-14.43)	0.00267*** (4.05)	-0.000861 (-0.61)	-0.0149*** (-12.16)	0.000555 (1.05)
Not working	-0.0252*** (-11.07)	-0.0341*** (-17.02)	-0.00446*** (-4.10)	-0.0279*** (-11.53)	-0.0385*** (-18.13)	-0.00324*** (-3.01)	-0.0227*** (-9.71)	-0.0320*** (-16.48)	-0.00358*** (-4.19)
No or never attended school	.	.	.	.	.	.	.	.	.
Primarily school	0.0262*** (16.98)	0.00325** (2.09)	-0.00588*** (-6.35)	0.0264*** (16.03)	0.00938** (5.71)	-0.00226** (-2.57)	0.0251*** (15.88)	0.00872** (5.70)	-0.00220*** (-3.04)
Secondary school	0.0496*** (25.14)	0.00711** (3.78)	-0.00908*** (-8.52)	0.0488*** (23.61)	0.0159*** (8.03)	-0.00454*** (-4.43)	0.0474*** (24.03)	0.00969** (5.36)	-0.00375*** (-4.51)
High school	0.0698*** (36.48)	0.00524** (2.94)	-0.0136*** (-13.47)	0.0721*** (36.14)	0.00715** (3.91)	-0.0117*** (-12.66)	0.0634*** (33.53)	-0.000870 (-0.52)	-0.00939*** (-12.48)
College	0.0921*** (31.88)	-0.0101*** (-4.46)	-0.0191*** (-15.85)	0.100*** (33.88)	-0.0186*** (-8.35)	-0.0191*** (-18.44)	0.0872*** (31.42)	-0.0245*** (-12.31)	-0.0146*** (-17.91)
Location (1=Rural)	0.00310** (2.37)	0.0189*** (15.87)	0.00422*** (6.53)	-0.000792 (-0.56)	0.0208*** (16.66)	0.00276*** (4.39)	0.000426 (0.32)	0.0193*** (17.25)	0.00364*** (7.40)
Age	0.00641** (18.77)	0.00320** (10.82)	0.000910*** (5.61)	0.00825** (22.69)	0.00352** (11.31)	0.000393*** (2.63)	0.00781** (22.13)	0.00340** (11.86)	0.000398*** (3.24)
Age^2	-0.00006** (-19.46)	-0.00004** (-12.23)	-0.00001*** (-7.33)	-0.00009** (-23.97)	-0.00004** (-13.42)	-0.000007*** (-4.52)	-0.00009** (-23.81)	-0.00004** (-14.67)	-0.000006*** (-4.88)
HH Members	0.0162*** (42.81)	0.0132*** (39.62)	0.00103*** (5.56)	0.0168*** (42.36)	0.0127*** (36.38)	0.00115*** (6.60)	0.0167*** (44.43)	0.0116*** (36.37)	0.000887*** (6.43)
Gender (1=Male)	-0.00207 (-0.72)	-0.0117*** (-4.53)	-0.00290** (-2.06)	0.00259 (0.85)	-0.0171*** (-6.28)	-0.00349*** (-2.63)	0.00807** (2.84)	-0.0194*** (-7.91)	-0.00361*** (-3.44)
Observations	297,276	297,276	297,276	295,155	295,155	295,155	315,672	315,672	315,672

Note: t statistics in parentheses * p<0.10; ** p<0.05; *** p<0.01"

Source: Data Processed

Contrariwise, For informal (individual) sources, households who own less land are likely to access credit from informal sources; households who do not own land are more likely to access informal sources. According to Bester (1985), for banks, the usage of collateral is the signaling for the quality of borrowers. The low-risk borrowers are assumed to be able to provide a sufficient amount of collateral to distinguish themselves from high-risk ones. However, an interesting counterargument came from Kislal et al. (2013) who argued that informal lenders rely less on collateral. This is caused by the availability of borrower information, including private information, due to close relation to the borrower. Conversely, the land ownership variable shows a positive sign but does not significantly impact households' credit access to non-bank financial institutions in 2017 and 2018. Indeed, the variable shows a negative sign even though it has a small magnitude of influence. This implies that collateral does not matter for credit access from non-bank financial institutions. This finding is consistent with Nguyen & Qian (2012), who found that borrowing from non-bank financial institutions is less likely to be collateralized. Their study found that, on average, commercial banks, both state and private banks, are 11% more likely to request collateral than non-bank financial institutions.

Marital status significantly influences credit access, both from banks and non-bank financial institutions, as well as individuals. However, the magnitude of the probability of accessing credit from those sources is different among the group of marital status. Based on the 2017 regression model, the probability of married heads of households accessing credit from banks is 8 percentage points higher than those that have never been married. For credit access from non-bank institutions and individuals, heads of households who are married have a higher probability of accessing credit than ones that have never been married, with a probability of 4.7 and 1 percentage point, respectively. This finding is consistent with the findings of Tran et al. (2018), who suggested that having a married head of household increases the probability of the

household obtaining credit. This is related to the greater responsibilities of married heads of households, particularly men's heads of households. Additionally, Akerly (1995) argued that in a majority of cases, married men are more likely to be financially responsible for their families.

Working status is also considered one of the determinants of household access to credit sources. The heads of households who work in the informal sector are less likely to access credit from formal sources, both from banks or non-bank financial institutions, compared to the heads of households who work in the formal sector. If the head of household works in the informal sector, the probability is -0.01 and -0.16 percentage points lower than if they work in the formal sector when accessing credit from banks and non-bank financial institutions, respectively. Instead, those who work in the informal sector are more likely to access credit from informal sources. The heads of households working in the informal sector are more likely to access credit from informal sources; the probability is 0.3 percentage points higher than if they work in the formal sector. It implies that formal lenders prefer to give credit access to those who work in the formal sector rather than the informal one. These findings are similar to the findings of Sekyi (2017), who found that working in the formal sector positively impacts credit access in Wa Municipality, Ghana. For formal credit sources, lending their money to informal workers is riskier than lending it to formal ones. According to Pratap & Quintin (2008), on average, formal wages are higher than informal wages. Average earnings differential could simply reflect the fact that formal workers tend to be well-educated and well-experienced more than informally employed ones.

he other important socio-economics determinant factors are education, geographic factor, sex, and household member. For education, the results show that heads of households with the highest level of education (college graduates) are more likely to access credit from banks rather than those who only graduated from senior high school, junior high

school, and elementary-high school. However, the head of households who only finish high school, junior high school, or elementary-high school still has a higher probability of accessing credit from banks compared to those who never went to school. The head of households who are college graduates and senior high school graduates have 8.9 and 7.2 percentage points higher than those who never attend school. On the contrary, the highest educated heads of households are less likely to access credit from non-bank financial institutions rather than those who never attended school. Nevertheless, those who graduated from senior high, junior high, and elementary school still have a greater likelihood of accessing credit from non-bank financial institutions. The higher the education of the head of the household is, the smaller the probability of accessing credit from an informal source. These findings indicate that more literate heads of households have a greater probability of accessing credit from formal sources. These results are consistent in all observation periods. These findings are consistent with the findings of Barslund and Tarp (2008), who argued that additional years of education of the head of household significantly reduces the probability of the household demanding credit from informal sources. Our findings are also similar to the findings of Jin and Zhang (2019), who found that the low education of the head of the household contributes to lower participation in formal credit.

An unexpected result is found in the influence of geographic factors on household credit access. In 2017, households who live in urban areas had a positive sign but did not have a significant influence on banks' credit access. On the contrary, that variable shows a negative sign with a strong significant effect on credit access from banks in 2018, even though the variable did not have a significant impact in 2019. Furthermore, households who live in urban areas are more successful in accessing credit from both non-bank financial institutions and individual sources than those who live in rural areas. These results are not consistent with several previous

studies. It indicates that credit access from banks is not only limited to urban people.

The age of heads of households has a significant influence on credit access from all sources. However, the older the age is, as shown by (age^2), the lesser the probability of credit access, both from formal and informal sources. These findings support the findings of Barslund and Tarp (2008), who argued that the older the head of the household is, the lesser the demanded credit is. It indicates that older people are more settled and are less likely to take new capital-demanding initiatives. Also, the sign and significance of this variable are consistent in all the observation periods.

Household members (HH Members) reflect the family size. The results show that greater household size is more likely to access credit from all of the sources. Togba (2012) argued that a larger household size implies higher expenses. Most of the time, the budget cannot cover the expenses of all household members. Therefore, to smooth their consumption, households need to access credit.

One interesting finding is shown by the gender variable. Banks do not always rely on gender when opening their credit access. In 2017 and 2018, that variable had no significant effect on the probability of credit access from banks. It implies that there are no differences in the probability of credit access from banks between male and female heads of households. In 2019, however, male heads of households were more likely to access credit from banks than female ones. Specific to the 2019 banks' credit access model, our findings support Zeller (1994) and Tran et al. (2018). The results of credit access from non-bank financial institutions and individuals are consistent in all of the observation periods. These results show that male heads of households are less likely to access credit from a non-bank financial institution and individual sources rather than female ones. This implies that lending activities from those credit sources are not gender-biased.

CONCLUSION

Understanding households' characteristics regarding their access to financial sources are important as an underpinning for policy design in improving financial inclusion. Household access to financial sources, particularly credit, has been widely discussed to address the gap between the demand and supply of credit for households. However, the studies related to households' credit access with regard to income class are still limited, particularly in the case of Indonesia. The credit rationing theory underlines the conceptual framework. Previous studies have revealed that credit is rationed by income class and collateral. Socio-economic aspects, such as household head marital status, working status, education, gender, geographic factor, age, and household size, are also the determinant factors of accessing credit by households.

Based on the logit estimation, income class and landowning (a proxy of collateral) successfully explain the credit rationing phenomenon. These results are consistent in all observation periods. Moreover, heads of household marital and working status, as well as education level, consistently impacts households' access to credit sources. In contrast, other characteristics seem inconsistent due to their varying impact in the different observation periods. The marginal effect estimations show that, in all observation periods, households in the higher-income class are more likely to access credit from formal sources than those in the lower-income class. Conversely, poorer households are less likely to access credit from formal sources and more likely to access credit from individuals. These findings confirm the phenomenon that credit is rationed by income classes. However, the result of the 2019 model reveals more positive shades. The inequality of credit access related to the income class was reduced in 2019 compared to its access in 2017 and 2018.

Our results show that households who own lands are more likely to access credit from banks rather than those who do not. The contra finding is revealed in the individual credit access model. These results imply that land ownership,

which can be used as collateral, is considered for banks' credit access. Therefore, these findings support the fact that in Indonesia, household credit access to banks is rationed by collateral. Interestingly, land ownership does not seem to be a consideration factor to access credit from non-bank sources. The social capital related to the close relationship between lender and borrower determines successful lending without collateral, according to previous studies. Several significant findings from socio-economic factors imply that factors, such as the head of the household's marital status, working status, education, living location, age, gender, and family size, are determinants of credit access for all sources. Though, the direction and the magnitude of influence vary among sources and may differ in all periods of observations.

REFERENCES

- Ackerly, Brooke A. 1995. "Testing The Tools of Development: Credit Programmes , Loan Involvement , and Women's Empowerment." *IDS Bulletin* 26 (3)(1989):56–68.
- Amendola, Alessandra, Marinella Boccia, Gianluca Mele, and Luca Sensini. 2016. *Financial Access and Household Welfare Evidence from Mauritania*.
- Badan Pusat Statistik. 2017. *Survei Sosial Ekonomi Nasional (SUSENAS) Kor , 2017*.
- Badan Pusat Statistik. 2018a. *Booklet Survei Angkatan Kerja Nasional Agustus 2018*. edited by Subdirektorat Statistik Ketenagakerjaan. BPS RI.
- Badan Pusat Statistik. 2018b. *Survei Sosial Ekonomi Nasional (SUSENAS) Kor , 2018*.
- Badan Pusat Statistik. 2019. "Survei Sosial Ekonomi Nasional (SUSENAS) Kor , 2019."
- Banerjee, Abhijit V and Esther Duflo. 2007. "The Economic Lives of the Poor." *Journal of Economic Perspectives* 21(1):141–67.
- Barslund, Mikkel and Finn Tarp. 2008. "Formal and Informal Rural Credit in Four Provinces of Vietnam." *The Journal of Development Studies* 44 (4)(April 2008):485–503.
- Baster, Helmut. 1985. "Screening vs . Rationing in Credit Markets with Imperfect Information." *American Economic Review* 75(4):850–55.
- Besanko, David and Anjan V Thakor. 1987. "Collateral and Rationing: Sorting Equilibria in Monopolistic and Competitive Credit Markets." *International Economic Review* 28(3):671–89.
- Bester, Helmut. 1985. "Screening vs. Rationing in Credit Markets with Imperfect Information." *The American Economic Review* 75(4):850–55.
- Cai, Dongliang, Quanyun Song, Shuang Ma, Yang Dong, and Qiuhua Xu. 2018. "The Relationship

- between Credit Constraints and Household Entrepreneurship in China.” *International Review of Economics and Finance* 58:246–58.
- Demirgüç-Kunt, Asli, Leora Klapper, Dorothe Singer, and Peter Van Oudheusden. 2015. “The Global Findex Database 2014: Measuring Financial Inclusion around the World.” *World Bank Policy Research Working Paper* 7255 (April):1–88.
- Dinh, Phan, Christopher Gan, Gilbert V Nartea, and David A. Cohen. 2013. “Journal of Asian Economics Formal and Informal Rural Credit in the Mekong River Delta of Vietnam : Interaction and Accessibility.” *Journal of Asian Economics* 26:1–13.
- Fadun, Solomon Olajide. 2015. “Financial Inclusion, Tool for Poverty Alleviation and Income Redistribution in Developing Countries: Evidences from Nigeria.” *Academic Research International* 5(3):137–46.
- Ghosh, Jayati. 2013. “Microfinance and the Challenge of Financial Inclusion for Development.” *Cambridge Journal of Economics* 37(September 2013):1203–19.
- Gitaharie, B. Y., L. Soelistianingsih, and T. Djutaharta. 2017. “Financial Inclusion: Household Access to Credit in Indonesia.” Pp. 309–19 in *Competition and Cooperation in Economics and Business*. London: Taylor & Francis Group.
- Gutiérrez, Emilio and Kensuke Teshima. 2016. “Does Household Financial Access Facilitate Law Compliance? Evidence from Mexico.” *Economics Letters* 149:120–24.
- Hardiawan, Donny, Arief Anshory Yusuf, and Bagdja Muljarijadi. 2018. “The Impact of Expenditure Inequality and Socioeconomic on Crime Rates in Indonesia: Cross Sectional Study Using Spatial Econometrics and Geographically Weighted Regression.” Pp. 150–69 in *Advance in Social Science, Education and Humanities Research (ASSEHR), Volume 16*.
- Jin, Yuhuan and Sheng Zhang. 2019. “Credit Rationing in Small and Micro Enterprises : A Theoretical Analysis.” *Sustainability* 11(2019):1–15.
- Johar, Meliyanni, Prastuti Soewondo, Ardi Adji, Retno Pujisubekti, Satrio Harsa Kunthara, and Iqbal Dawam Wibisono. 2017. *In Data We Trust? An Analysis of Indonesian Socio-Economic Survey Data*. Jakarta Pusat.
- Johar, Meliyanni, Prastuti Soewondo, Retno Pujisubekti, Harsa Kunthara, and Ardi Adji. 2018. “In Data We Trust? An Analysis of Indonesian Socio- Economic Survey Data.” *Bulletin of Indonesian Economic Studies* 0(0):1–22. DOI: <https://doi.org/10.1080/00074918.2018.1515474>
- Karlan, Dean and Jonathan Zinman. 2009. “Observing Unobservables: Identifying Information Asymmetries With a Consumer Credit Field Experiment.” *Econometrica* 77(6):1993–2008.
- Karlan, Dean and Jonathan Zinman. 2010. “Expanding Credit Access: Using Randomized Supply Decisions to Estimate the Impacts.” *Review of Financial Studies* 23(1):433–64.
- Kislat, Carmen, Lukas Menkhoff, and Doris Neuberger. 2013. “The Use of Collateral in Formal and Informal Lending.” *Kiel Working Papers* (1879).
- Ledgerwood, Joanna, Julie Earne, and Candace Nelson. 2013. *The New Microfinance Handbook: A Financial Market System Perspective*. edited by J. Ledgerwood, J. Earne, and C. Nelson. The World Bank.
- Maipita, Indra and Setyo Tri Wahyudi. 2017. “Income Distribution and Inequality in Indonesia: Study on Middle Class Household.” *Jurnal Ekonomi Pembangunan: Kajian Masalah Ekonomi Dan Pembangunan*. DOI:10.23917/iep.v.v18i1.3974.
- Nguyen, Ha and Rong Qian. 2012. “The Cross-Country Magnitude and Determinants of Collateral Borrowing.” *Policy Research Working Paper* 6001(March).
- Nuryartono, Nunung. 2007. “Credit Rationing of Farm Households And Agricultural Production: Empirical Evidence in The Rural Areas of Central Sulawesi, Indonesia.” *Jurnal Manajemen & Agribisnis* 4(1):15–21.
- Pratap, Sangeeta and Erwan Quintin. 2008. “The Informal Sector in Developing Countries: Output, Assets, and Employment.” Pp. 373–92 in *Personal Wealth from a Global Perspective*. Oxford University Press.
- Sanjaya, I. Made and Nursechafia. 2015. “Inklusi Keuangan Dan Pertumbuhan Inklusif: Analisis Antar Provinsi Di Indonesia.” *Buletin Ekonomi Moneter Dan Perbankan* 18:281–306.
- Sekyi, Samuel. 2017. “Rural Households ’ Credit Access and Loan Amount in Wa Municipality , Ghana.” *International Journal of Economics and Financial Issues* 7 (1)(February):506–14.
- Skott, Peter and Leopoldo Gómez-Ramírez. 2018. “Credit Constraints and Economic Growth in a Dual Economy.” *Structural Change and Economic Dynamics* 45:64–76. DOI:<https://doi.org/10.1016/j.strueco.2018.02.003>
- Togba, Edith Leadaut. 2012. “Microfinance and Households Access to Credit : Evidence from Côte d ’ Ivoire.” *Structural Change and Economic Dynamics* 23(4):473–86. DOI: <https://doi.org/10.1016/j.strueco.2012.08.002>
- Tran, Thi Kieu Van, Ehsan Elahi, Liqin Zhang, Muhammad Abid, Quang Trung Pham, and Thuy Duong Tran. 2018. “Gender Differences in Formal Credit Approaches: Rural Households in Vietnam.” *Asian-Pacific Economic Literature* 32(1):131–38. DOI: <https://doi.org/10.1111/apel.12220>
- Wooldridge, Jeffrey M. 2012. *Introductory Econometrics: A Modern Approach*. CRC Press. ISBN-10: 1111531048
- Wulandari, Permata and Salina Kassim. 2019. “Socio-Demographic Determinants of Credit Rationing at Baitul Maal Wa Tammwil in Indonesia.” *Journal of Islamic Monetary Economics and Finance* 5(3):645–

72.DOI:<https://doi.org/10.21098/jimf.v5i3.115>

6

- Yusuf, Arief Anshory and Andy Sumner. 2015. "Growth, Poverty and Inequality under Jokowi." *Bulletin of Indonesian Economic Studies*. DOI: <https://doi.org/10.1080/00074918.2015.1110685>
- Yusuf, Arief Anshory, Andy Sumner, and Irlan Adiyatma Rum. 2014. "Twenty Years of Expenditure Inequality in Indonesia, 1993-2013." *Bulletin of Indonesian Economic Studies*. DOI: <https://doi.org/10.1080/00074918.2014.939937>
- Zanin, Luca. 2017. "Determinants of the Conditional Probability That a Household Has Informal Loans given Liquidity Constraints Regarding Access to Credit Banking Channels." *Journal of Behavioral and Experimental Finance* 13:16–24. DOI: <https://doi.org/10.1016/j.jbef.2017.02.002>

Appendix 1. Probit Regression Results

	2017			2018			2019		
	Bank	Non Bank	Individual	Bank	Non Bank	Individual	Bank	Non Bank	Individual
20% Poorest	0	0	0	0	0	0	0	0	0
	(.)	(.)	(.)	(.)	(.)	(.)	(.)	(.)	(.)
20% Poorer	0.198***	0.121***	-0.000228	0.177***	0.118***	-0.00883	0.200***	0.0984***	0.0284
	(16.48)	(10.44)	(-0.01)	(14.68)	(10.02)	(-0.53)	(18.47)	(8.89)	(1.60)
20% Middle	0.332***	0.175***	-0.0211	0.313***	0.167***	-0.0346**	0.306***	0.152***	0.00699
	(28.40)	(15.32)	(-1.35)	(26.91)	(14.49)	(-2.08)	(28.81)	(13.92)	(0.39)
20% Richer	0.501***	0.251***	-0.0432***	0.481***	0.249***	-0.0622***	0.461***	0.219***	-0.0130
	(43.22)	(21.84)	(-2.66)	(42.03)	(21.66)	(-3.67)	(43.42)	(19.83)	(-0.70)
20% Richest	0.662***	0.315***	-0.117***	0.624***	0.321***	-0.143***	0.566***	0.287***	-0.132***
	(53.17)	(25.33)	(-6.28)	(51.42)	(26.26)	(-7.41)	(49.24)	(23.85)	(-5.98)
Single	0	0	0	0	0	0	0	0	0
	(.)	(.)	(.)	(.)	(.)	(.)	(.)	(.)	(.)
Married	0.580***	0.338***	0.250***	0.688***	0.421***	0.352***	0.647***	0.453***	0.330***
	(22.03)	(13.28)	(6.21)	(24.94)	(16.40)	(7.61)	(24.43)	(17.24)	(6.39)
Divorced	0.318***	0.213***	0.147***	0.406***	0.264***	0.297***	0.389***	0.319***	0.335***
	(9.85)	(6.84)	(3.03)	(12.19)	(8.48)	(5.56)	(12.31)	(10.29)	(5.87)
Widowed	0.379***	0.197***	0.131***	0.481***	0.226***	0.220***	0.489***	0.271***	0.193***
	(13.34)	(7.14)	(3.03)	(16.24)	(8.22)	(4.54)	(17.36)	(9.70)	(3.65)
Own Land (1=Yes)	0.201***	0.00277	-0.0909***	0.234***	0.00398	-0.0914***	0.245***	-0.00175	-0.0767***
	(25.69)	(0.35)	(-7.99)	(30.81)	(0.53)	(-7.73)	(32.82)	(-0.23)	(-5.87)
Working in formal Sector	0	0	0	0	0	0	0	0	0
	(.)	(.)	(.)	(.)	(.)	(.)	(.)	(.)	(.)
Working in informal sector	-0.0105	-0.1000***	0.0579***	-0.0115*	-0.108***	0.0491***	-0.00419	-0.0907***	0.0140
	(-1.44)	(-13.06)	(4.83)	(-1.65)	(-14.63)	(4.00)	(-0.61)	(-12.32)	(1.04)
Not Working	-0.139***	-0.218***	-0.0869***	-0.141***	-0.227***	-0.0667***	-0.117***	-0.209***	-0.102***
	(-10.58)	(-15.71)	(-3.91)	(-11.04)	(-16.69)	(-2.90)	(-9.35)	(-15.17)	(-3.94)
No or never attended school	0	0	0	0	0	0	0	0	0
	(.)	(.)	(.)	(.)	(.)	(.)	(.)	(.)	(.)
Primarily school	0.163***	0.0201**	-0.0859***	0.148***	0.0534***	-0.0356***	0.143***	0.0532***	-0.0469***
	(16.58)	(2.09)	(-6.46)	(15.77)	(5.68)	(-2.59)	(15.61)	(5.67)	(-3.07)
Secondary school	0.286***	0.0434***	-0.139***	0.256***	0.0884***	-0.0741***	0.253***	0.0590***	-0.0829***
	(25.36)	(3.79)	(-8.44)	(23.88)	(8.07)	(-4.40)	(24.23)	(5.38)	(-4.48)
High school	0.381***	0.0322***	-0.225***	0.357***	0.0410***	-0.219***	0.324***	-0.00552	-0.243***
	(35.55)	(2.94)	(-13.64)	(35.43)	(3.90)	(-12.79)	(32.86)	(-0.52)	(-12.73)
College	0.476***	-0.0663***	-0.358***	0.468***	-0.118***	-0.438***	0.423***	-0.174***	-0.473***
	(34.69)	(-4.39)	(-13.47)	(36.51)	(-8.14)	(-15.00)	(33.68)	(-11.84)	(-14.35)
Location (1=Urban)	0.0167**	0.116***	0.0718***	-0.00380	0.118***	0.0510***	0.00210	0.121***	0.0933***
	(2.37)	(15.88)	(6.54)	(-0.56)	(16.66)	(4.39)	(0.32)	(17.25)	(7.42)
Age	0.0335***	0.0197***	0.0155***	0.0396***	0.0200***	0.00726***	0.0384***	0.0213***	0.0102***
	(18.77)	(10.83)	(5.61)	(22.67)	(11.31)	(2.63)	(22.11)	(11.87)	(3.25)
Age^2	-	-	-	-	-	-	-	-	-
	0.000356***	0.000226***	0.000205***	0.000428***	0.000241***	0.000126***	0.000423***	0.000268***	0.000155***
	(-19.46)	(-12.23)	(-7.34)	(-23.94)	(-13.43)	(-4.52)	(-23.79)	(-14.68)	(-4.88)
HH Members	0.0846***	0.0814***	0.0175***	0.0806***	0.0724***	0.0213***	0.0823***	0.0724***	0.0227***
	(42.88)	(39.89)	(5.56)	(42.36)	(36.53)	(6.62)	(44.49)	(36.60)	(6.45)
Gender (1=Male	-0.0108	-0.0722***	-0.0493**	0.0125	-0.0969***	-0.0644***	0.0397***	-0.121***	-0.0926***
	(-0.72)	(-4.53)	(-2.06)	(0.85)	(-6.28)	(-2.63)	(2.84)	(-7.91)	(-3.45)
_cons	-3.525***	-2.462***	-2.276***	-3.666***	-2.412***	-2.213***	-3.610***	-2.452***	-2.429***
	(-77.70)	(-54.08)	(-33.00)	(-78.60)	(-53.75)	(-30.19)	(-79.34)	(-54.33)	(-29.71)
N	297276	297276	297276	295155	295155	295155	315672	315672	315672